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ABSTRACT

This document contains 4 papers: "A Research Base for a Diversified System of Higher Education," by T.R. McConnell, which deals with some of the many kinds of investigations necessary for designing and developing a pluralistic system of higher education; "The Structure of University Costs," by C.F. Carter, which discusses an exercise in cost analysis conducted by the Committee of Vice-Chancellors in England; "Postgraduate Research in the Humanities," by E. Rudd, which discusses the results of a survey which, in part, tried to determine how the graduate student sets about his research and what provisions the universities make for research students in the arts--such as the teaching and supervision they receive, and the facilities and services that are provided for them; and "Supplementary Predictive Information for University Admission," by J. Drever, which discusses the need for considering the student's school record, in addition to the 'A' level examinations, for university admission, and the usefulness of devising a test that will measure the student's aptitude for the work for which he is applying. (AF)

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A RESEARCH BASE FOR A DIVERSIFIED SYSTEM OF HIGHER EDUCATION

T. R. McCONNELL

(Center for Research and Development in Higher Education, University of California, Berkeley, U.S.A.)

The title of this paper is obviously too pretentious. In the time available I can offer only samples of the many kinds of investigations necessary for designing and developing a pluralistic system of higher education. I need not discuss the topics of today's other speakers, and I shall ignore still other lines of research.

I

Higher education is everywhere reaching an increasing proportion of young people and a growing number of adults. The United States has outstripped all other western countries in social demand for college and university education. But the pressure for access to higher education is intensifying everywhere. In Britain, social and educational tradition long retarded the growth of university enrolment. In 1962 I found that neither the universities nor the University Grants Committee planned to broaden the band of ability for university selection. In projecting university enrolment through 1970, the UGC assumed an essentially level proportion of university entrants to the age group, varying around 4.6 percent. Although the Robbins Committee concluded that by 1980 the country should be providing entry to full-time higher education for about 17 percent of the age group, it nevertheless presupposed a level standard of ability for admission. There is good reason to believe, however, that the threshold for admission to higher education will be lowered. Indeed, if I read the facts correctly, this may already have occurred. I suspect that Sir Eric Ashby spoke prophetically when he said¹ that "... by putting on the market, as it were, only Lincolns and no Fords, we have not fulfilled adequately our loyalty to contemporary society". Sir Eric went on to say: "In our present social climate I don't believe excellence can be safeguarded (as we have tried to safeguard it in Britain) by keeping mediocrity out of higher education. This is simply unrealistic. I believe it must be safeguarded as you are trying to do in America, by the peaceful coexistence of mediocrity and excellence. They have - after all - got to coexist elsewhere in society, and it is an educational commonplace that Gresham's Law does not hold for college degrees; indeed mediocrity is improved by association with excellence. Fords do not drive Lincolns off the market."

Everything we know about human variability in aptitude, achievement, interests, motivations, attitudes, values, and intellectual dispositions among students who will comprise the future college and university population underscores the need for a highly diversified educational system. Fitting students into

traditional educational structures will no longer serve their needs or the needs of society. Instead, the system of institutions will have to be adapted to the characteristics and potentialities of students.

Furthermore, the more we learn about manpower requirements, the more we are impressed by the necessity of differential educational opportunities. Both John Kenneth Galbraith and Barbara Ward (Lady Jackson) recently pointed out that land long ago ceased to be the almost exclusive basis of economic development. Capital replaced land as the source of power over enterprise. But capital is no longer scarce, and therefore no longer critical. Galbraith pointed out² that specialized talent has now become the primary factor in industrial enterprise. "..... the great sources of wealth," said³ Barbara Ward, "are now in the mind, in research, in all the manifold applications of trained intelligence....."

It has been said that although the industrialized countries of Europe achieved their present economic level in spite of restricted educational opportunity beyond elementary schooling, it took them a long time to reach this stage of economic growth, whereas the more generous extension of secondary and higher education in the United States, the Soviet Union, and Japan at earlier points in their development was a significant force in the attainment of their present high level of economic and technological advancement.⁴

The world is experiencing a second industrial revolution for which advanced technology is the impetus. Britain led the first industrial revolution, but now lags in the second, both because its production of highly qualified manpower in science, technology, and management is insufficient, and because its output of technicians is too scant and too inefficient. Speaking of the scarcity of technicians, one of the recent reports of the Committee on Manpower Resources for Science and Technology has said⁵ that "Up to the present this manpower group, so vital to effective utilization of qualified manpower, has been fed largely from the shop floor and by part-time study." Sir Peter Venables estimated⁶ some time ago that a tenfold increase in the number of young people between 18 and 20 in full-time attendance at technical colleges was essential if the country's need for technicians and technologists was to be met.

II

One of the basic research tasks in engineering a scheme of diversified higher education is to explore the pool of available talent; to study the dispersion of interests, aptitudes and abilities through the labyrinth of institutions and programs which comprise the system; to follow students into their careers and their civic and cultural activities, and to plan their return for re-education.

Too often we have described talent only in terms of the abilities required for an elite system of higher education emphasizing the arts, the sciences, and the major professions. But attributes other than verbal ability may be more relevant to diverse educational and vocational performance, as

Lady Venables has shown⁷ in her studies of selection for technical curricula.

Furthermore, in assessing scholastic aptitude we have ordinarily measured a very limited range of attributes. In studies at the Center for Research and Development in Higher Education at Berkeley, our interest early turned from conventional measures of academic aptitude and achievement to such characteristics as theoretical and aesthetic orientations; intellectual independence and personal autonomy; impulsivity; interests, motivations, attitudes, values, and goals. Our purpose has been to learn how these attributes are related to openness to change and to continuing development along significant dimensions of personality and performance. We have looked especially for indices of creativity, and we have asked to what extent colleges and universities recognize the signs of intellectual ingenuity or artistic talent and the degree to which they nurture creative behaviour.

Some of the characteristics with which we have been concerned are presumably relatively stable, while others are more responsive to experience; some are essentially peripheral, while others are central and pervasive; and some dispose the individual toward openness and change, while others incline him toward inflexibility and arrested development. Our knowledge of the relationships of these attributes to various kinds of educational attainment, to vocational performance, and to personality development beyond the years of formal education is at present elementary, indeed, but we are investigating these associations along many fronts.

Several of the Center's investigations are designed to chart the flow of students with diverse attributes and backgrounds through the maze of institutions and curricula in the United States. What are the points of entry? How do students fan out within the complex? Is their course straight toward well-defined educational goals or is it circuitous? Are there stages at which they may reassess their interests, abilities, and aspirations? Are there successive choice points at which they may change their educational programs or move from one institution to another? How can the whole course of the individual's educational journey to more effectively rationalized?

As the result of one of its "flow" studies, the Center has recently published⁸ an analysis of the patterns of employment and college attendance of some 10,000 high school graduates in sixteen communities across the United States. Forty percent of the graduates in this study entered college as full-time students. Slightly more than half of the entrants stayed for four years, but only half of them were graduated in that period. Although level of ability was related to college attendance, there was a closer association between socio-economic status and college entrance. Relatively few students from high socio-economic levels went to college regardless of ability, but a disproportionate number of those at lower levels failed to go even if they had high academic aptitude. The variable most related to attendance and persistence was motivation. The report observed that this motivation is probably formed early in life, largely in response to parental influences and early school experiences. Among other factors interdependently associated with college attendance were personal autonomy and nonauthoritarianism, a strong interest in theoretical and aesthetic

matters, and an experimental, flexible turn of mind. In this country, a somewhat comparable study is under way at the University of Essex.

Presently in process at Berkeley is a study of how students distribute themselves among the colleges and universities in four states representing different regional educational traditions and varied systems of higher education. The first phase of the investigation will determine how 37,000 high school seniors deployed themselves in the labor force, in higher education, in home-making or in the military services, and what happened to them during the first year after leaving high school. The second phase will concentrate on the processes by which 47,000 ninth grade students make decisions concerning future education and work and the relative influence that parents, schools, peers, interests, values and intellectual dispositions have on these choices.⁹

In your country the Committee headed by Dr. F.S. Dainton, the Vice-Chancellor of the University of Nottingham, is about to report a somewhat comparable study of the flow of students from school to University with particular reference to specialization in science and technology. I have seen some of the findings,¹⁰ which have profound implications for the structure of both secondary and university education.

III

The Center's flow studies are recent phases of its long interest in differential recruitment to American colleges and universities. One of its research reports summarized the scholastic aptitude of entering students for the country as a whole, for its four principal regions, and for type of institutions and level of programs. This and other investigations¹¹ have documented the enormous variability in academic aptitude of a national sample of college entrants and of particular student bodies. In one of the states studied, for example, only 16 percent of the freshmen in the least selective institution had scholastic aptitude test scores above the average score in the most selective institution. Both institutions are small private liberal arts colleges. In the national sample the variability of aptitude scores was approximately the same for the least selective institution - a southern Negro college, and the most selective one - Yale University.

The Center has also discovered an unexpectedly high degree of variability among students at advanced levels. For example, in one of our studies the average aptitude score of seniors in the least selective medical school was only slightly above the general average of undergraduate college entrants. The most and least selective medical schools are as different intellectual worlds as are the most and least selective undergraduate colleges.¹²

But the Center has been less interested in differential recruitment in scholastic aptitude and achievement than in certain other characteristics. In company with the Robbins Committee and other investigators in Great Britain, we have found great differences in the social and cultural composition of student

bodies. In the United States students from lower socio-economic levels are more heavily concentrated in certain groups of institutions than in others. The state colleges and the junior colleges are attended primarily by students whose fathers are in low-status occupations, whereas the private liberal arts colleges tend to attract more than half of their students from homes in the high-status occupational categories.

In Britain, Abbott has pointed out¹³ that institutions with relatively large numbers of entrants from culturally limited homes have an especially difficult problem of successfully introducing these students to the world of ideas, of quickening their aesthetic interests, and of widening their cultural horizons. I remember writing in the Universities Quarterly some 20 years ago that, as the British universities admitted more students with culturally limited backgrounds, informal methods of general education would prove inadequate and more formal programs of liberal studies would need to be devised. However, I see little evidence that this has happened, the general year at Keele to the contrary notwithstanding.

Since the Center's studies, and those of Lady Venables and of Jackson and Marsden¹⁴, among others, have underlined the importance of family background and motivation in stimulating working-class youth to take advantage of opportunities for further education, it follows that both Britain and the United States will have to devise a wide range of compensatory programs to offset the limitations of cultural background and unkindled intellectual interests.

On a visit to Britain in 1948 I asked Mr. Tomlinson, then Minister of Education, why the Labour Government was not reorganizing the secondary schools. He replied that the grammar school was one of England's most successful institutions, and that the Labour Government, instead of abolishing it, wished to send working class students to it. How discouraged he would be if he knew how slowly the social composition of the grammar school changed. "Every custom, every turn of phrase, every movement of judgment, informs the working-class parent and the working-class child that the grammar schools do not 'belong' to them," wrote Jackson and Marsden.¹⁵ These authors went on to say that "..... the 'open' school which belongs to the neighbourhood, the 'open' university which involves itself in local life rather than dominates or defies it from behind college or red brick walls" must be created. What is in order in both our countries is an intensive program of research on methods of arousing and satisfying suitable educational aspirations. Only if this is done will a democratic society realize its ideals, and an industrial society avail itself of the human resources which are now the most crucial forms of economic capital.

The Berkeley Center, as I said a moment ago, has long been involved in research on what are termed - sometimes erroneously - "non-intellective" characteristics, such as attitudes, values, interests, and more pervasive and deep-seated aspects of personality like autonomy, creativity and intellectual disposition.¹⁶

Without going into detail, let me summarize quickly some of our findings concerning differential recruitment in various aspects of intellectual disposition.

The student bodies of three academically selective liberal arts colleges have been compared on instruments designed to measure interest in ideas and aesthetic orientation. On a combination of these two measures, 35 and 37 percent of students in two of the institutions were above the normative mean, whereas more than twice as many of those in the third college were so elevated. Dr. Paul Heist of the Center has devised an index of intellectual orientation comprised of eight categories ranging from one characterized by broad intellectual interests, theoretical and, especially, aesthetic orientation, to one reflecting little interest in ideas, even an anti-intellectual attitude, and a highly pragmatic orientation. He compared the characteristics of women students in five institutions. In one, 22 percent of the women fell in the three highest categories, but in another, 74 percent were found at the same level. In another study, 13 percent of entering students at Berkeley were classified in the top three of the eight categories while 56 percent of the freshmen at Reed, a small distinguished, highly selective liberal arts college to the north, were so categorized.

Significant inter-institutional variations in intellectual disposition are found not only at undergraduate, but also at more advanced levels. Medical schools can be differentiated on the basis of the proportions of their students who have high scores on both the theoretical and aesthetic scales of the Allport-Vernon-Lindzey Study of Values, a combination which tends to characterize persons with both strong intellectual interests and creative potentiality. Three medical schools, Harvard, Chicago and New York University, have an unusually large proportion of such students. It is not surprising that these institutions produce a large number of medical teachers and researchers.

There are interesting differences in intellectual disposition among groups of students studying certain subjects or professions, or those preparing for different specialties in these fields. Majors in physics, for example, differ from those in engineering. Furthermore, majors in various fields of engineering differ from one another. Mechanical engineers are much less theoretically oriented than those in electrical engineering, whose profiles look very much like those of students specializing in physics. Neither is medicine a unitary field when characterized by students' orientations. There are differences in combined scores on theoretical and aesthetic scales among students in a variety of medical specialties.

Studies of differential recruitment would seem to be essential in monitoring Britain's efforts to diversify its systems of higher education. For example, one might ask whether the new universities, which propose to develop distinctively do, in fact, draw different kinds of students from those who enter Oxbridge or the civic universities. Likewise, one might explore possible differences in recruitment to the technological universities and parallel fields of study in the other universities. One might ask, too, whether the new polytechnics draw students who differ in interests, motivations, attitudes, values, and intellectual orientations from those who enter the technological universities, or, for that matter, the degree or non-degree programs in technical colleges. One might then go on to characterize the aims and programs of the institutions, and to consider ways of distributing students more "appropriately" among available educational opportunities.

The State of California presumably has a diversified educational system, incorporating some common and some differential functions among three groups of institutions - junior colleges, state colleges, and the campuses of the University of California. Some studies, however, indicate that student attributes and institutional characteristics are incongruent. For example, the University purports to emphasize theoretical and scientific training in agriculture, while the California State Polytechnic College puts greater stress on agricultural production and practical agriculture. The two institutions differ considerably in the amount of time students are required to spend in the basic and supporting sciences. Nevertheless, the two student bodies do not differ significantly in theoretical and scientific orientation. Various reasons for the incongruence may be hypothesized: the institutions did a poor job of selection; students were unaware of their own psychological characteristics or of differences in the educational programs; or the choice of institutions was determined primarily by geographical proximity.

Although the policy is now being debated, Britain's system of financial aid to students presumably frees them in considerable degree from the necessity of attending local institutions, and makes the entire complex of universities available to them. The growing system of scholarships and loans supplied from federal, state, and private sources in the United States may make greater student mobility possible. The distribution of students among institutions within and among the states may consequently change markedly.

The question of "fit" between students and institutions is a highly complicated one, but no system of diversified higher education can ignore the problem of aiding students to distribute themselves relevantly - whatever relevantly in fact means - among different kinds of institutions and courses. We have three tasks: 1) mapping the attributes of the potential student population; 2) mapping the educational complex; and 3) somehow superimposing one map on the other. The problem of consonance and dissonance in student and institutional characteristics is more manageable now not only because of progress in identifying and measuring a wider range of human attributes, but also because we now know much more about characterizing institutions. From the sociological view of institutional analysis, Clark, formerly at the Center and now at Yale, has recently described¹⁷ approaches to the characterization of colleges and universities in whole or in part. To me however, the most promising method of describing and differentiating college environments has been developed by Pace and his associates. Pace's work has culminated¹⁸ in the development of the College and University Environment Scales which may be used to identify institutional stress on practicality, community, awareness, propriety, and scholarship. Pace has also devised¹⁹ methods of describing subcultures and of characterizing some of the main features of institutions such as their administrative, curricular, instructional, and extracurricular structures and activities. Perhaps studies are under way to determine what differences exist among the institutional and subinstitutional environments in the British complex. It would be both interesting and instructive in any event, to have answers to such questions as the following: What differences in institutional climate exist between the technological universities, other newly established universities, the civic universities, Oxbridge, and the polytechnics? Are there significant differences among the institutions in any one of these groups?

Are institutions all of a piece; for example, are there differences in environmental press, to use Pace's term, among the divisions of a particular technological university, or among those of other new universities, Sussex, for example?

IV

It is not only desirable to study the characteristics of students and institutions; it is even more important to ask how students change during their educational careers, and what is the impact on student development of particular features of institutional character. Put more technically, the question is: do different treatments have differential effects on students of comparable or dissimilar initial characteristics? This is an extremely difficult question methodologically, but nevertheless it is one to which an increasing number of investigations are being addressed.

Many of these studies can be grouped under the general rubric of "persistence and change". There have been many studies of so-called student wastage by Malleson and others in this country and in the United States. I should like to mention only two. In a Center study of 21 women and 25 men who were rated as exceptionally high on manifest or potential creativity, only two were graduated from the college they entered. Heist reported that the proportions of identified creatives who withdrew from seven quite dissimilar institutions ranged from approximately 50 percent to 80 percent.

This loss of creative talent seems to be as great in science and engineering as in the arts. In fact, there is some evidence to suggest that most institutions almost systematically weed out the nonconforming, inventive, innovative scholar. In his recent article²⁰ in the Universities Quarterly, Snyder of MIT reported that that institution "..... is losing three times more students who preferred as freshmen to try out new solutions, fool around with ideas, or take cognitive risks than those preferring a well ordered life with tangible results." He reported that students with high scores as freshmen on a so-called complexity scale had a final grade point average slightly below that of the group with low Complexity scores. MIT seems to reward students who are safe and straightforward intellectually and discourage those who show evidence of having an open, critical and flexible turn of mind and who tend to look for novel and complicated rather than simple and conventional solutions. None of the institutions the Center has been studying succeeds in understanding the potentially creative individual or in providing an environment which he finds congenial, much less one in which his gifts will flower.

Studies of student change and institutional impact require appropriate measures of output. The Center has been only mildly interested in the usual measures of academic achievement. Beyond this, it has attempted to assess a wider range of outcomes, in fact, essentially the same attributes emphasized in studies of entering students, namely attitudes, values, cultural interests,

intellectual sophistication, and intellectual orientation. It has been concerned about students' ability to think critically, their intellectual and aesthetic interests, their intellectual flexibility and openness to ideas, their ability to tolerate ambiguity and to entertain new solutions, their personal autonomy and independence of judgment, their freedom from undue constraints in thought and action, their ways of relating themselves to others, and their emotional stability.

Final characteristics, of course, are functions of input. Outcomes are presumably the result of interaction between students' initial characteristics and their college and non-college experiences, plus what might be called the normal process of maturation. It is difficult, indeed, to single out the unique effect of any one of these factors on individual development. There is, however, a growing body of evidence on the degree to which students do change during college.

The classic study of student development was Newcomb's Personality and Social Change, which appeared²¹ in 1943. The subjects were students at Bennington, a college for women. Newcomb and a group of associates have now reported²² a study of changes over the college years in a recent generation of Bennington students. The report stated that the most salient norms in the Bennington community are individualism, unconventionality, intellectuality, and somewhat less prominently, tolerance of differences in others' behaviour. The major directions of change in the student body over four years seemed to represent adaptations to the community norms which were pressed on students by a variety of positive and negative sanctions. The main directions of change were toward increased individualism, intellectuality, tolerance, and unconventionality. Changes in individualism were reflected in greater self-awareness, self-confidence, independence, and self-expression. The development of intellectuality was marked by greater and broader intellectual awareness, heightened intellectual involvement, and long-term intellectual commitment. Greater tolerance was expressed in increased understanding and acceptance of differences in attitudes, values, and points of view. It is significant that the nature of these changes depended in ways too complicated to detail here, on a degree of congruence between the students' initial attitudes and the community norms.

Dr. James Trent of the Berkeley Center has compared²³ changes between freshman and senior years on the part of students in five Catholic colleges and more than 1500 students attending a number of public, private, and Protestant institutions. On a scale presumably measuring a general readiness to express impulses, a propensity for active imagination, a tendency to value sensual reactions and to seek gratification either in conscious thought or overt action, he found that in all colleges seniors scored higher on this scale than they did as freshmen, with the sole exception of the Catholic college seniors, who scored lower than they did when they entered. That is to say, the Catholic students changed in the direction of greater acquiescence and more restricted and uncreative behavior; in a word, toward greater docility. These findings, I suspect, could be duplicated in some colleges of certain other denominations.

Most studies of student development report only mean changes in groups of students over two to four years. But means obscure individual variations; changes may be in either direction. The Center's studies, however, have

brought to light some fairly dramatic instances of individual development, although admittedly they are more often intensifications of initial tendencies than radical alterations in personality.

Heist has called my attention to a student who, during four years, gained almost two standard deviations on a scale measuring interest in ideas and abstractions and who gained almost as much on a scale of aesthetic orientation. The student also gained two standard deviations on the Complexity scale. His Autonomy score moved from the 50th to the 98th percentile; he was at entrance religiously liberal, and became more so. He became much less constrained, more ready to express his ideas and feelings. He started out as a fraternity man, but became disillusioned with this environment and was really influenced toward intellectualism by his acquaintance with two young campus scholars. Space precludes other examples, including ones representing little measured development and others reflecting actual "deterioration".

The problem of sorting out environmental influences is, of course, even more difficult than that of measuring behavioral changes. However, there are studies under way not only of massive institutional effects, such as Trent's, but also of the impact of faculty cultures, faculty-student relationships, peer group relationships, patterns of academic experience, and various residential accommodations.

Oxtoby has just reported²⁴ that almost all studies on the effects of institutional environments on students' behavior are being done in America. Nevertheless, he noted that such work has begun over here at Brunel, Bradford, Leicester, Essex, Sussex and elsewhere. It would be fascinating to compare outcomes in some of the newer British universities with those in the more conventional ones. One would like to know whether the results of studying industrial management in a technological university closely identified with commerce and industry differ from those in a more self-contained academic environment. What are the differences in outcomes, if any, between sandwich courses and programs of full-time continuous college study? What are the differences in initial characteristics and attitudes toward learning between students who are firm-based and those who enter technical colleges or technological universities directly? Do the two groups also differ in academic attainments?

Here I wish to make my only comment on the economics of higher education. In the United States, and I take it in Great Britain as well, higher institutions are going to be increasingly subjected to various forms of cost-effectiveness analysis. Unfortunately, the outputs which are ordinarily used in these analyses are such items as the number of students produced at various levels in relation to initial intake, the number produced per full-time faculty member, or unit expenditures at various levels of instruction. Such variables as these ignore behavioral outcomes and the relative effectiveness of institutions, education programs, methods of instruction, or organizational and administrative arrangements. It is an investigation of these and other effects that I have been urging. Until such effects are measured, cost-effectiveness analyses will be relatively meaningless and, if improperly used, dangerous.

V

Let me turn now to a different but not unrelated aspect of the development of a diversified system of higher education. I refer to the problems of planning and coordination. The number and variety of students to be educated, the diversity and complexity of the careers for which they must be trained, the rational selection of educational treatments, and the scarcity of financial resources combine to make system-wide planning, cooperation and coordination essential. Speaking at the annual meeting of the American Council on Education in Washington on October 12 this year, Sir John Wolfenden said²⁵ that if each of the 44 British Universities and other institutions offering degree-level work did exactly what it pleased, "..... the chances of the emergence of a coherent and efficient overall pattern would be infinitesimal." He might have added that Britain not only faces the necessity of coordinating its universities; it has before it the even more difficult problem of articulating the several forms and levels of post-secondary education, especially the universities and the new system of polytechnics.

Producing statewide master plans for higher education has become fashionable in the United States. These plans vary enormously in scope as well as in the range and adequacy of the research which undergirds them. The work of the Illinois Board of Higher Education provides one of the best current examples of the planning process, although it by no means reaches the level of sophistication exemplified in Blaug's paper on "Approaches to Educational Planning".²⁶ The Illinois Board published its basic master plan in 1964, and this plan has been under continuing revision. A Master Plan, Phase II appeared in 1966. In preparing these plans, the Board had before it the results of numerous investigations conducted with the cooperation of institutions, faculty members and other professionals, and college and university administrators. Between 1963 and 1966 the Board published fifteen of these studies, ranging from the admission and retention of students to college and university governance.

The Berkeley Center has underway an intensive investigation of the substance and process of planning in five states which differ in planning experience, forms of statewide coordination, and patterns of public and private institutions. The emphasis in the study is on how cooperative planning may affect the diversity, distinctiveness, and flexibility of individual institutions, with especial reference to the preservation of their identity and functional autonomy. Among the effects to be observed are changes in institutional character; the structure of authority; the roles and relationships of governing boards, administrative officers, faculty members, and students; and inter-institutional relationships.

Planning and coordination are closely related. Some years ago the Center published²⁷ an investigation of the coordination of higher education in twelve states. This investigation is now being updated and expanded by the American Council on Education. From these and other studies it is apparent that there will be increasing tension between institutional autonomy and central control, between local enterprise and central initiative.²⁸ These tensions characterize the British as well as the American scene. It will not be possible

to resolve the tensions rationally until we learn far more about how planning and coordination limit the choices which are open to particular institutions; how limits on self-determination affect faculty and administrative morale; how constraints on functions, programs, and student intake influence an institution's external relationships; and to what extent concerted action leaves room for local imagination and innovation. When completed the University of London-Chelsea study (Project No. 8, Register of Research, SRHE) will answer some of these questions.

One of the most interesting documents I have seen, one for which I think there is as yet no counterpart in the United States, is the memorandum on "The Essential Liberties of Institutions of University Standing" submitted by the Ministry of Education to the Robbins Committee. No doubt the Department of Education and Science would amend this memorandum materially today. Nevertheless, the document suggests the areas in which the effects of central coordination and control, whether of a government ministry or a grants committee, should be investigated. "Autonomy" has become a relative term, and the "essential liberties" of educational institutions involving as they do such matters as responsiveness to social needs, broad public accountability in purpose and performance, and the relationships of colleges and universities to the state, may in the end be philosophically and even politically determined. But we will be less polemical about the issues involved if we can bring to bear upon them empirical knowledge about inter-organizational relationships and influences.

VI

One of the major purposes of planning and coordination is to design and maintain diversity among institutions and educational programs. Secretary Crosland's famous Woolwich address was a call for diversifying higher education at degree level by establishing a new system outside the universities. The Department of Education and Science announced that once the new polytechnics had been designated, no new ones would be added to the list for ten years, and that during the same decade there would be no new universities or accessions to university status. The Department apparently believed that it could assure diversity by stopping the scramble for "higher" status and arresting efforts to imitate prestigious university models.

If American experience is indicative, this is a vain hope. The state colleges of California have never accepted the non-university status which successive statewide plans have, from the Colleges' point of view, imposed on them. Neither in California nor elsewhere, to my knowledge, has anyone identified effective social supports for diversity and distinctiveness among institutions of higher education. Until such external and internal supports can be discovered, the effort to allocate functions, programs, students and resources among institutions will be abortive.

Among the studies now under way at Berkeley is one of the extent to

which individual campuses in the University of California may attain distinctiveness while conforming to the broad goals of the system as a whole. The new campus at Santa Cruz is modelled, to some degree at least, on the new University at York. The Santa Cruz response to the impersonality and the monolithic structure of the Berkeley campus is to decentralize the institution into a number of relatively autonomous colleges, each with a distinctive academic emphasis. Faculty members become fellows of these colleges as well as university teachers and researchers. The size of each college is small enough to permit students to know one another and to get acquainted with the fellows. The Chancellor at Santa Cruz has declared that the University will take the education of undergraduates seriously, and will not sacrifice their liberal education to excessive specialization, professional attitudes, or research.

But strong influences toward conformity to educational tradition are already apparent. Speaking not only of Santa Cruz but of other experimental institutions, the director of the Center's study of distinctiveness recently wrote²⁹ as follows:

"The criteria for hiring and promoting the faculties for the new colleges, on the basis of the evidence thus far, are essentially the same as those used at the older campuses... This is the way, we are told, to assure that the faculty of the new college will not be regarded as second-rate and that the work will be first-rate. But it is a widely held belief now that the traditional criteria for placement and advancement, which have emphasized publications, research, guild standing, and professional mobility, have helped to create the problems that have produced the current student disaffection."

Furthermore, the older and larger campuses at Los Angeles and Berkeley still provide the model of scholarship and research which faculty members, whatever their professed interests in undergraduate liberal education, may be expected to emulate. Scholarly norms are established by a faculty member's peers, not only among his immediate colleagues, but among scholars who comprise his scholarly or professional society. Will his commitment to the Santa Cruz educational philosophy, even if sincerely made when he accepts appointment, survive the powerful pressure toward conformity to the conventional academic and scholarly world?

In the course of my visits to some British institutions last year, I was told that departmentalism had already raised its ugly head at a new university organized into schools of related studies rather than departments. In a discussion there of the pressures toward similarity and conformity with which the University might have to cope, two scientists declared that every change in their fields since the University was established had been in the direction of a more traditional departmental organization. This institution is not a member of a highly integrated system such as the University of California. Nevertheless, it is subject to certain kinds of standardization under the University Grants Committee, such as a uniform faculty salary schedule, the cost and planning of academic buildings and residences, and the purchase of equipment. Although no

one in the universities or the UGC may want it, allocation of financial resources by formula is probably just over the hill. These minimal steps towards uniformity may not destroy educational dissimilarity and distinctiveness. But the future almost certainly holds still more concerted planning and coordination. Will these constraints tend to press the new universities into a more conventional pattern? We may ask the same question about the new technological universities. I participated a year ago in an animated discussion of the likelihood that these institutions would disown their long tradition and do everything possible to breach the academic citadel of the established universities. Surely students of organizational behavior are studying these problems.

I implied a moment ago that it is probably futile to try to freeze the status of particular institutions or of educational systems. Willy-nilly, technical colleges with courses approved for CNAAs degrees or with a large component of advanced work will strive to become polytechnics, and it will be amazing if some of the polytechnics do not manoeuvre into a position from which, when the propitious time arrives, they can move into the university club. Again, students of organizational behavior have at hand a remarkable opportunity to study transformation from one educational character to another. The new technological universities have been converted in a short time from technical colleges to colleges of advanced technology, and then to technological universities. In the United States, teachers colleges are changing from single to multi-purpose institutions, and state colleges are becoming universities in structure if not in true character and quality.

The Berkeley Center is about to undertake a study of the processes of institutional change and adaptation. Such questions as the following will be asked: What were the changes in control and financing, and the consequences of these changes in relations with external agencies and constituencies, levels and sources of power and influence; in the institution's autonomy, initiative, and distinctiveness; and in internal organization and administration? What were the professed changes in purposes and functions of the institution, and the consequences of these changes in student recruitment and admission, faculty selection and staff morale during the transition from old faculty orientations to new attitudes and expectations? What does organizational theory have to offer in predicting or guiding productive changes in major aspects of an institution's life? What can be learned from the study of institutional evolution concerning organizational behavior on the one hand, and the means of guiding fruitful educational change on the other? No doubt we will learn something about these questions from Burgess' Study (Project No. 12, Register of Research, SRHE) of the transition of CATs to university status.

This has been a sketchy and spotty sampling of the kinds of investigations which are needed in the development of a diversified system of higher education. To organize a comprehensive investigation of these problems is extremely difficult in the United States because of the sheer number of institutions and students, and because of the enormous variation in kinds of colleges and universities and in arrangements for their governance. Britain, however, has a more manageable problem. Elvin has pointed out³⁰ that the necessary research will need to be done by a variety of agencies, both governmental and voluntary, including,

presumably, the Department of Education and Science, the University Grants Committee, voluntary associations of universities and scholars, as well as particular institutions and individual researchers.

VII

May I be so bold as to suggest that the Society for Research into Higher Education might appropriately serve not only as a clearing house and disseminating center, which it already has so effectively, but also as an agency to lay out a program of research into the major problems of developing a comprehensive system of higher education. The Society need not, and presumably, could not assign any of these researches to particular agencies or persons. What it could do, however, would be to stimulate the necessary investigations, coordinate the efforts of individuals and organizations voluntarily engaged in research, encourage collaboration, and take major responsibility for considering the implications of the findings for educational policy and practice.

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THE STRUCTURE OF UNIVERSITY COSTS

C. F. CARTER
(Vice-Chancellor, University of Lancaster)

The main purpose of this paper is to discuss an exercise in cost analysis recently conducted by the Committee of Vice-Chancellors; I am able to do this because a paper on the results has now been made available for general circulation in universities. These results relate to costs allocable to particular subject departments, but it will be well first to look at the build-up of total costs.

Percentage shares of expenditure, 1964-5,
Universities (not ex-CATs), G.B.

	<u>Average</u>	<u>Range (excluding Oxford and Cambridge)</u>
Administration	6.9	4.4 to 23.1
Departmental maintenance (including academic staff)	72.8	56.7 to 77.8
Maintenance of premises	13.6	8.9 to 19.6
General educational and student amenity expenditure	4.6	1.3 to 7.7
Miscellaneous expenditure	1.4	0.4 to 8.7
Capital expenditure met from income	0.8	
	100.1	

The range of these figures is remarkable. They are in part occasioned by the peculiar distribution of expenditure in new universities, which must (for instance) support an administration before taking students. The exclusion of new universities (including Sussex) makes the range for administration 4.4% to 8.4%. But we have little idea what this range signifies. In part, it will be due to differences of accountancy practice; it is believed, for instance, that some universities charge departmental telephones to 'administration' while others charge them out to departmental maintenance. In part, it will be due to differences of structure and responsibility which are naturally reflected in different levels of expenditure, and in part to differences in efficiency; but we have no means of isolating this last part, and therefore no means of saying how serious the problem of efficiency is and how it may best be tackled. The same comment can be made on the other items of expenditure. For instance, it is known that costs of heating, cleaning and portering differ widely from one university to another, but this fact by itself can only produce the question "So what?"

There is indeed a great danger in crude inter-university comparisons.

The University Grants Committee produced to the Select Committee on Estimates a table showing the departmental costs per student, and the staff-student ratios, by 'faculty' for each university. Since that time they will no doubt have been able to produce a revised version of the table, as a by-product of their statistical folly in trying to divide teaching costs from research costs; and a horrid suspicion enters the mind that they may have looked at such a table before making the recent quinquennial settlement. Yet what on earth does it all mean? Even a figure which looks more precise and readily measurable than average cost, the staff-student ratio, dissolves into mist if you try to look at it closely. The academic staff of my university in the current year is, on various definitions, almost anything from 155 to 203, and the figure we return in accord with UGC requirements has no exact relationship to the number of units of teaching strength. And what is a student? There are students away for a year in France, graduate students working abroad, occasional students taking less than a full load of courses, part-time students who give us a lot of work and others who give us no work at all. The UGC has greatly improved its handling of student statistics in recent years, but the fact remains that no one measure of student numbers is uniquely right and demonstrably better than any other.

I conclude that there is a long and hard road before us, studying the detail of university cost statistics with the care and rigour which we would apply to a scholarly enquiry (or which a good business man would apply to the facts of his business) before we can feel confident that we are deriving relevant results. I report now on a first step on this road. It is concerned with the costs of departments. A 'department' is a group of people who regard themselves as practising a named subject: such a group is identifiable even in universities which say that they do not have departments, though there are of course boundary problems. A 'faculty' in the UGC definition is a group of named departments. Although departments are not homogeneous (and it will be seen below that we made one subdivision in order to obtain greater homogeneity), a certain pressure towards similarity is exercised by the requirements of professions and by the use of external examiners. At least, departments are much more homogeneous than faculties: any comparison of university costs by faculty is suspect because of the great differences in the proportions of effort which can be ascribed to different departments in the faculty.

Our study was based on a concept of 'total cost', including an apportionment to departments of a share of the central costs of the university. In the absence of other information, this apportionment was made on the basis of the department's share of total student numbers - a student being counted as a fraction related to the share of his time which is spent in the department (so that students doing four subjects of equal weight count as a quarter of a unit in the student load of each department), and part-time students being appropriately allowed for in cases where they are important. However, a central service may on occasion be of much more importance to one department than to others, and such cases have to be dealt with by special estimation. The reason for including central costs is that one then dodges difficulties caused by the different practices of universities in ascribing expenditure to departmental maintenance or to other heads of the accounts.

For a like reason, we went in the first instance for a total expenditure including money from outside funds, and the imputed value of (major) services obtained free from outside bodies; though we also made calculations based on UGC -financed expenditure only. Departments differ greatly in the proportion of their research which is based on outside funds, and it seemed likely that regularities would be more easily observed using the inclusive definition. If one department owns a machine which another uses free in an outside institute, it seems inappropriate to show a difference in expenditure, if the cost to the nation is the same in the two cases. But it is not always true that the inclusive definition produces the more regular results.

The cost side of our study therefore covers: academic salaries, departmental administration, technical staff costs, departmental supplies and departmental libraries, heat, light, power, building maintenance (but not a rent for the building; we found this too difficult to estimate): expenditure from outside grants and earnings: the share of central expenditure: and the imputed cost of major outside facilities used free of charge. Costs of student maintenance were excluded.

What does a university department 'produce' as a consequence of this expenditure? The answer is (a) a continuing service of the conservation of knowledge, which is not a measurable quantity; (b) new knowledge (or the result of 'research') which is not directly measurable - we were not attracted by the suggestion that the number or weight of publications should be used as a proxy variable; (c) completed first degrees (with, one supposes, a certain 'value added' to those who leave before obtaining a degree); (d) completed higher degrees of various kinds. The easily obtainable data relate to (i) 'equivalent full-time undergraduates' - i.e. the sum of all the fractions of student time spent in the department in the year: this is related to the first degree output over three or four years in a way which depends on the course structure of the university; and (ii) 'equivalent full-time graduates' - which, if one wishes to be sophisticated, would allow for the fact that some graduate students, by engaging in demonstrating or tutorial work, themselves 'feed back' a service into the system.

The relation of the costs of one year to the completed degrees of that year will be difficult to interpret if sizes of departments have been altering, or the course structure has changed. The numbers of equivalent full-time students provide in fact an appropriate measure of the 'value added' to the student body as a consequence of the expenditure of the year, provided that we allow for differences in intensity of teaching. This is what lies behind the UGC system of 'weighting' graduate students in Arts as 2, and in science as 3; but of course this is a very crude process, and we ought really to allow for differences between the years of undergraduate teaching.

However, for the purposes of this very preliminary investigation, we have simply taken the two variables, to be related to costs, as equivalent full-time undergraduates and equivalent full-time graduates. (We also tried some experiments using staff numbers as a variable: but, of course, the academic staff are so large a part of costs that the results can mean little. I think,

however, that it might be useful to try the effect of using numbers of research associates, assistants, and fellows as a proxy variable for research effort). We did not distinguish between the various kinds of graduate student, though we certainly should have done so.

There are various ways of analysing the relationship of costs to student numbers. It should first be noted that it is not obvious that costs arise from students; it is certainly the custom in some universities for student intake to be adjusted to an exogenously determined staff number, and thus to cost. Second, there is a fairly high correlation between undergraduate and graduate numbers, which makes it difficult to identify separate contributions. When we have a larger range of data, it will be worth-while to try out some sophisticated statistical methods; but, for the present, when we are really trying to gain an understanding of the 'shape' of the data, it has seemed more sensible to look at the scatter diagrams and calculate the obvious regression lines.

Five departments have so far been covered - Civil Engineering, Economics, English, Physics and Zoology. The data relate to the year 1964/65. In order to make things as simple as possible for our less numerate colleagues, we calculated simple regressions of cost on weighted student numbers (and of weighted student numbers on cost) using the integers from 1 to 6 to weight graduate students. The results can be illustrated from Civil Engineering - 27 institutions are included (Oxford, Cambridge, Keele and certain London schools are excluded throughout - in the case of Oxford and Cambridge, because the data on college costs are not yet adequate).

Weights (1, 0) - i.e. regression using undergraduate numbers only:

$$\begin{aligned} r &= 0.505 & C &= 0.50 S + 46.78 & (C = \text{cost in } \pounds 000, \\ & & & (0.20) & (24.43) & S = \text{student number}) \\ & & S &= 0.51 C + 54.67 \\ & & & (0.20) & (23.92) \end{aligned}$$

Weights (0, 1) - i.e. regression using graduate numbers only:

$$\begin{aligned} r &= 0.839 & C &= 1.74 S + 62.16 \\ & & & (0.41) & (15.54) \\ & & S &= 0.40 C - 18.84 \\ & & & (0.10) & (11.39) \end{aligned}$$

Weights	(1, 1)	$r = 0.782$
	(1, 2)	$r = 0.894$
	(1, 3)	$r = 0.928$
	(1, 4)	$r = 0.934$
	(1, 5)	$r = 0.932$
	(1, 6)	$r = 0.926$

With weights	(1, 4)	$C = 0.41 S + 21.10$
		(0.09) (21.06)
		$S = 2.13 C - 20.67$
		(0.46) (53.84)

It can be seen that the reliability of the constant term is low, so there is no definite evidence here of economies of scale. However, accepting the first

equation with weights (1,4) as it stands, a department with 60 undergraduates and 10 graduates would cost £62,000, while one with 120 undergraduates and 20 graduates would cost £103,000. The corresponding equation with UGC weights, (1,3), would give costs £60,000 and £105,000.

In this case, we ran the regressions excluding Imperial College, which is much the largest institution, but its exclusion produces no improvement. We also have the regressions for UGC -financed costs only:

Weights (1,3)	$r = 0.920$	$C = 0.42 S + 19.13$
		(0.09) (19.09)
		$S = 1.99 C - 12.15$
		(0.43) (46.08)
Weights (1,4)	$r = 0.914$	$C = 0.34 S + 25.46$
		(0.08) (18.06)
		$S = 2.43 C - 30.34$
		(0.53) (56.50)

The first of these equations, for instance, gives a UGC -financed cost for 60 undergraduates and 10 graduates of £57,000. The correlations with staff numbers alone are very high (0.949 and 0.952), and the constant terms are insignificant: so that a good predictor of total costs is to multiply the staff number by £5,910, and of UGC financed costs to multiply that number by £5,086. In fact, the high correlations with student numbers are probably due to the precision with which universities have come to regulate either staff or student numbers to give a set staff-student ratio.

So this all looks a bit boring. However, other departments yield some points of interest. First, take Economics. Although (since Cambridge is excluded) LSE is much larger than the other 29 institutions covered, tests suggest that it should be included; it lies almost exactly on the regression line of C on S, with UGC weights (1,2), calculated from the other 29 institutions. With the weights (1,2):

$$\begin{aligned}
 r &= 0.954 & C &= 0.34 S + 6.44 \\
 & & & (0.07) \quad (15.64) \\
 S &= 2.69 C - 1.65 \\
 & & & (0.53) \quad (45.62)
 \end{aligned}$$

There is no evidence either of economies of scale due to a positive intercept on the axis $S = 0$, or of any curvature of the regression line. For UGC -financed costs the highest correlation, $r = 0.969$, is with weights (1,3), but with weights (1,2):

$$\begin{aligned}
 r &= 0.967 & C &= 0.32 S + 6.82 \\
 & & & (0.06) \quad (14.58)
 \end{aligned}$$

Non-UGC costs are of no great importance for this subject.

Contrast this, however, with the results for English. Here 34 institutions are included, and weights (1, 2) yield a correlation of 0.911. The equations are:

$$\begin{aligned} C &= 0.23 S + 16.51 \\ &\quad (0.05) \quad (10.01) \\ S &= 3.55 C - 27.24 \\ &\quad (0.69) \quad (46.36) \end{aligned}$$

With weights (1, 3) the correlation is still 0.911, but

$$\begin{aligned} C &= 0.20 S + 18.92 \\ &\quad (0.04) \quad (9.63) \end{aligned}$$

Correspondingly, for UGC -financed costs and weights (1, 2):

$$\begin{aligned} r &= 0.916 \text{ and } C = 0.22 S + 18.13 \\ &\quad (0.04) \quad (9.36) \\ S &= 3.82 C - 39.49 \\ &\quad (0.74) \quad (48.28) \end{aligned}$$

There is a reasonable probability that the economies of scale are real in this case: 100 equivalent undergraduates cost £40,000, and 200 cost £63,000. (The smallest department has $S = 53$ and the largest $S = 484$. Both are in Scotland). But would one have expected, a priori, that costs would fall more steeply for English than for Civil Engineering or Economics?

Physics gives another interesting result, in that there are plainly two lines, one for 16 departments engaged in nuclear and/or space research, and the other for 27 not so engaged on any significant scale. For the total costs of 'big' Physics departments, correlations are improved by excluding University College London (which spends about four times as much, per student, as Manchester, because of its access to expensive research facilities). With this exclusion, the correlations are:

(1, 0)	0.617
(0, 1)	0.794
(1, 1)	0.753
(1, 2)	0.821
(1, 3)	0.852
(1, 4)	0.865
(1, 5)	0.869
(1, 6)	0.869

The constant terms are occasionally negative, and much smaller than their standard errors. Thus, with UGC weights (1, 3):

$$\begin{aligned} C &= 1.86 S - 29.44 \\ &\quad (0.60) \quad (249.51) \end{aligned}$$

Naturally, the exclusion of non-UGC expenditure makes a great deal of difference to this group. With the same weights, $r = 0.948$:

$$C = 0.66 S - 23.34$$

$$(0.19) \quad (75.34)$$

and now the inclusion of University College makes little difference:

$$C = 0.66 S - 22.99 \quad r = 0.948$$

$$(0.18) \quad (73.41)$$

- the highest correlation for UGC -financed expenditure being with weights (1,4):

$$r = 0.957 \quad C = 0.57 S - 18.90$$

$$(0.15) \quad (71.86)$$

The 'light' Physics departments show, surprisingly enough, their best correlation with weights (1,2) ($r = 0.807$), but the UGC weights (1,3) give the result, hardly any different:

$$r = 0.804 \quad C = 0.47 S + 37.66$$

$$(0.12) \quad (25.80)$$

$$S = 1.37 C + 16.49$$

$$(0.34) \quad (48.77)$$

For UGC -financed costs only, and weights (1,3), we have:

$$r = 0.763 \quad C = 0.37 S + 42.01$$

$$(0.10) \quad (21.72)$$

Finally, for Zoology (30 institutions) the correlation with undergraduate numbers is low (0.492), and improvements are obtained with each increase of graduate weighting up to (1,6) (0.791). With UGC weights:

$$r = 0.737 \quad C = 0.44 S + 22.65$$

$$(0.11) \quad (13.74)$$

$$S = 1.24 C + 21.95$$

$$(0.32) \quad (24.73)$$

- or, for UGC -financed expenditure alone:

$$r = 0.746 \quad C = 0.38 S + 22.01$$

$$(0.10) \quad (11.79)$$

Observe that there is better reason here to suspect economies of scale.

Obviously these data need to be extended to more departments and to more years, and to be subjected to more sophisticated techniques, before we can use them: the extension is in hand. But let us see roughly what they seem to

suggest:

(1) For English the marginal student (with UGC weights) costs £230 (£220 from UGC funds) and there is a considerable possibility of economies of scale: for Economics he costs £340 (£320 from UGC funds) with no strong evidence of a scale effect over a range of sizes from 19 to 867 weighted equivalent full-time students. Why the difference?

(2) With UGC weights (1, 3), the marginal student 'costs' from £440 to £500 in Civil Engineering, 'light' Physics, and Zoology, his cost to UGC funds being in the range £370 - 420. The marginal student in a 'big' Physics department, however, is related to a cost of £1860, of which about £1200 represents non-UGC costs: so the cost to UGC funds is £660, or half as much again as for the 'light' Physics departments. For Civil Engineering and 'big' Physics there is no evidence of any scale effect.

I do not claim that these are significant results; but they are obviously the sort of results we want to accumulate until some kind of regularity or pattern emerges.

 POSTGRADUATE RESEARCH IN THE HUMANITIES

E. RUDD

(Department of Sociology, University of Essex)

Almost all of us who are doing research on higher education are, almost by definition, doing applied research, and this means that our work is intended to produce results that will be used, results which we hope will influence some aspect of institutions of higher education and the way they operate. Perhaps the reasons why the results of research in the social sciences are so rarely used should itself be a subject of research. Some of the reasons, however, are obvious enough; for example Albert Cherns, in an article on Israel and India in the first issue of the SSRC Newsletter, has drawn attention to failures of communication between researcher and users, to the potential users' inertia, and to obstruction when the research upsets a vested interest. Another obstacle to the utilization of research of which I, as an economist, am especially aware, occurs when the researcher feeds into his recommendations for action his own value judgments. The user who rejects the value judgments is then likely to reject the results of the research.

I therefore believe research should be as free as possible from the researcher's own value judgments, either leaving the user to draw his own conclusions or putting forward several alternative value judgments and showing to what policy each combination of value judgment and research results leads. But I wonder if it is in fact possible to be as detached as this? Merely picking a research topic involves a value judgment - that the topic is of importance. Similar value judgements are involved in the choice of questions within the general topic that are to be investigated, the hypotheses that are to be tested. Some value judgments are therefore unavoidable; and the more controversial the topic the more likely they are to divide the researcher from the potential user. The research I shall be describing is almost as controversial as any research on universities can be, because the topic of research students is inevitably linked with the place of research in the universities, an extremely hot brick to handle. By the end of this paper you will be able to see to what extent I have succeeded in avoiding value judgments.

For the past three years the biggest single project of my research group at the University of Essex has been a study of graduate education in Britain. I am going to give a brief summary of those of our results relating to the provision that universities make for research students in the arts - the teaching and supervision they receive, the facilities that are provided for them, etc. Then I shall show the kind of recommendations that might, on different assumptions, follow from our findings.

Our data gathering has, in the main, taken five forms. Firstly we carried out a postal survey of British students who began graduate study (other

than teachers' training) in British universities in 1957/58. This achieved a response rate of 70%. It was concerned mainly with their experiences in employment, but also covered the question of whether they had achieved the qualifications at which they were aiming, and the reasons for any lack of success. Secondly, we carried out interviews with just under 1,000 current graduate students at university institutions, seeking information on such questions as how and why they came into graduate studies, the nature of their studies and their academic, social and financial problems. The research students interviewed were mainly in their second or third years. Thirdly we carried out a postal survey in which similar questions were put to part-time students. This achieved a response rate of 80%. Fourthly one of us (Renate Simpson) has been working on the history of graduate studies and in particular of the crucial decision to introduce the Ph.D. in Britain. Fifthly I carried out a series of open-ended interviews with academic staff, generally heads of departments, to discuss various aspects of their experience and practice in graduate education, and also their own careers.

A first book, on the careers of the 1957 graduate students, is now with the publishers and will appear in 1968. A second book, on the organisation and scale of graduate education, is in draft. In today's paper I shall be discussing a small part of the field it covers.

Graduate studies are the most rapidly growing part of the university scene. In the period from 1938 to 1966 the number of undergraduates increased fourfold, but the number of graduate students increased ninefold. Arts faculties have shared in this expansion. In the ten years from 1954/55 to 1964/65, a period in which the full-time postgraduate students in British universities (excluding those in education) increased from 8,900 to 20,300 - an increase of 128% - the proportion of arts students in the total also increased from 13% to 16%. However, the proportion of graduates who become full-time students has always been lower in the humanities than in pure science. One of the features of graduate study in the humanities follows from this. Apart from students following instructional courses, the numbers studying in any one department tend to be relatively small. Whereas a typical science department has between twenty research students and a hundred (some of course having more or less than these numbers), a humanities department typically has no more than twenty research students, and many have none or only two or three. This alone would generally prevent the research student in the humanities from being part of a research group; but in any case this is generally prohibited by the nature of the research - it is simply not group research. The contrast with science here can be overstated, and the image that one is tempted to form of the scientist doing his research as a member of a team while the arts student is a lone researcher is not entirely correct. Half the science students we interviewed were not working as part of a group, even if one defines the group so broadly that it includes people working on unrelated problems in the same general field. Only 9% of the scientists were part of a group working on the same problem. But, even so, there is some truth in this contrast, for the arts graduate hardly ever does his research as part of a group whereas a substantial proportion of scientists do.

A greater difference in the conditions under which arts students work is

produced by the nature of the work and the place of work. The fact that a chemist or an experimental psychologist works in a laboratory, which he probably shares with a fellow student, guarantees him a minimum of social intercourse. The arts student, however, does much of his work in libraries, which are places of silence. These overall conditions - the small numbers doing research in most arts departments, and the inevitably solitary nature of much of their work - underlie the problems of the research students in the humanities which I will now try to describe.

First, how does the student set about his research? He begins by finding a research topic and, unlike the science student, he generally decides for himself not only the field in which he wishes to work but also his detailed topic.

TABLE 1. Who chose the student's general field of research?

	Arts	Social studies and education	Science and technology
	%	%	%
Mainly the student	94	87	69
Mainly the supervisor	2	10	24
Both equally	4	3	6
Others	0	0	1
	—	—	—
	100	100	100
Number of respondents	112	78	476

TABLE 2. Who chose the student's detailed topic of research?

	Arts	Social studies and education	Science and technology
	%	%	%
Mainly the student	64	75	25
Mainly the supervisor	18	12	59
Both equally	17	13	13
Others	1	0	2
	—	—	—
	100	100	100
Number of respondents	112	77	472

The advantages of a student finding his own research topic are obvious. If he starts highly motivated to study a particular problem he is likely, other things being equal, to do better work than if he merely has a general wish to do research. Also the ability to see which problems are both important and likely to yield fruitful results seems to be one of the main characteristics that distinguish the more productive research workers from their more pedestrian colleagues. Trying to find his own topic is an essential first step towards gaining this ability. The disadvantages are less obvious. Firstly a student is often not a good judge of what can be done in the time available. A poor choice at this stage cannot generally be remedied later, and leads to difficulties that may bring about failure. Secondly where the supervisor has to a large extent suggested the problem he may well take a closer interest in it. I shall say more about the closeness of supervision later.

An American graduate student starts with one or two years of graduate courses before he begins his research. Part, but only part, of this course work brings him up to the level of British graduates. The rest not only broadens his knowledge of his field, but also equips him for research with some knowledge of research techniques and methodology. At some universities he may begin his research during this period; generally he will at least have some idea on what topic he wishes to work; but in most cases he is not called upon to fix firmly on this until he has succeeded in passing his courses.

On a much smaller scale some teaching of courses to research students is increasingly taking place in Britain, but at the time of our interviews, in 1965 and 1966, it had not affected most research students in arts. During their first year of graduate study, only one in five had attended any lectures at all that were specifically designed for graduate students, though 37% of them had attended courses intended at least partly for undergraduates in that year. Many more, however, reported having received some instruction in research techniques and methodology, either directly from their supervisors or in some other way, since starting graduate study. Only 38% reported having received no instruction at all. Not all the others considered that the instruction they had received was adequate however. In reply to the question "Would you have liked to have received more instruction in research techniques and methodology at the beginning of your postgraduate studies?" 56% of the arts students said 'yes'.

I discussed the teaching of research techniques at the outset of research with some of the academic staff whom I interviewed. A common reaction can be summed up as "There are no special research techniques or methodology in my field." This is not a subject on which I can possibly argue with those teaching in fields in which I am far from expert. I can only express surprise. Certainly Americans with whom I discussed this matter seemed to have no difficulty in finding material to teach that seemed to me a useful introduction to research, while many British students, as we have seen, are critical of the extent to which they have to learn their techniques the hard way.

The widespread lack of thorough courses of lectures and classes to launch students on their research makes the role of the supervisor more than ever important. It is in the frequency with which the student meets his supervisor

that the biggest contrast between the students in humanities and those in the sciences appears, as the next tables show.

TABLE 3. Whether students usually see their supervisor by appointment or more informally.

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
Usually by appointment	58	34	9	13
Usually informally	21	43	77	73
Sometimes by appointment and sometimes informally	21	23	13	14
	100	100	100	100
Number of respondents	116	76	265	234

TABLE 4. Frequency of appointments with supervisor (excluding students who do not see their supervisor by appointment)

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
More than 4 times a month	2	2	23	15
3 - 4 times a month	18	12	5	13
1 - 2 times a month	38	39	35	42
Less than once a month	40	42	35	28
Very variable	2	5	2	2
	100	100	100	100
Number of respondents	91	43	57	60

As the scientist's supervisor generally works in a nearby lab. or even in the same lab, there is no need for them to meet by formal appointment. There are plenty of opportunities for them to meet casually and discuss the student's progress and any difficulties that have arisen. A few science students have to make an appointment to see their supervisor - chiefly those supervised by a head of department - but even then they are likely to see him rather more frequently.

The substantial proportion of arts students who see their supervisor less than once a month are clearly working virtually on their own. However, when the arts student does get in to see his supervisor he is rather more likely to find the discussion with him as useful, as the next table shows.

TABLE 5. Whether the student regards discussion with his supervisor as useful.

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
No discussion with supervisor	1	1	1	2
Useful	72	64	68	65
Moderately useful	20	28	24	26
Not useful	5	7	4	4
Variable	1	0	3	3
	100	100	100	100
Number of respondents	115	75	258	217

Students were also asked if they were satisfied with the closeness of their supervision. 41% of research students in the humanities would have preferred closer supervision during the initial stages of their research - a period which some students likened to being thrown into a swimming bath and told to swim. In interpreting this figure it should be remembered that students who drowned at this stage were not available for interview, thus inflating the figure (59%) of those who were satisfied. The same students reported that at later stages of the research more of them (78%) were satisfied with the closeness of their supervision.

This is not of course a measure of whether the supervision of the student's work and his education in research are adequately carried out. It can be argued that though the student would like to be spoon-fed he learns better by finding out things for himself. On the other hand, it can be argued that he will learn more rapidly if he can discover the pitfalls in his field by some means other than tumbling into every one. But the quality of supervision has many facets other than its closeness. There is no time here to go into all of the possible defects in supervision, but in our enquiries we must have met every kind from sheer neglect to incompetence. The student who said "I have only one problem; my supervisor knows absolutely nothing about what I am doing, so he's no help" was far from unique. Bad supervision is of course to be found in all fields; but the greater remoteness of arts supervisors from their students seems to make it worse. The Robbins Committee remarked¹ four years ago that the

question "Who supervises the supervisor" had not been faced in many of our universities. It is doubtful if it has been faced yet. Scarcely any university seems to make any provision for such elementary problems as what a student should do if he finds that he cannot get on with his supervisor due to a clash of temperament.

Of course the research students have other contacts with the staff in addition to lectures and classes and working sessions with their supervisors. In particular there are seminars for research students or for staff and students. We did not find out how many departments do or do not run seminars, but half the research students in the humanities never go to any and, of those who do, only a third find them regularly useful.

TABLE 6. Research students' attendance at seminars and assessment of their usefulness.

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
None attended	48	21	9	33
Useful	17	21	28	24
Not useful but interesting	18	37	33	25
Not useful	8	1	7	2
Variable	6	12	22	15
Other	2	8	2	2
	100	100	100	100
Number of respondents	115	77	265	235

Then there are various contacts generally of an informal kind - in science departments these often seem to centre round coffee. Nearly half the humanities' students had discussed their work with members of staff other than their supervisor in the four weeks before their interview. Understandably the figure in science departments was higher, but the difference of 11% here is not large.

I will now turn from how the student is taught to consider where and how he works. It is here that we find the biggest contrasts between the science student and the student in the arts. The next table shows the extent to which universities provided our sample of research students with a working space of their own. Almost all the scientists or technologists have a working space of their own in their university.

TABLE 7. Students' working space in the university.

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
Allocated space in:				
Research laboratory	0	12	61	64
General laboratory	0	0	4	11
Library	11	3	0	0
Study room, office or other	11	59	39	55
No allocated space	78	33	2	1
N (=100%)*	119	78	266	234

* The individual percentages add up to more than 100 as some students have more than one working space.

For about a third of the scientists and a quarter of the technologists this is not as one would expect in a lab, but in study room or office. Many have both. In social studies and education two-thirds of the students have their own working space, but in the humanities seven research students in nine have no working space allocated to them in the university. The percentage who do have any allocated space at all is smaller than the percentage of technologists who have two spaces - both in a lab and an office.

Where then do they work? Of those who had no space of their own in the university, nearly half mainly worked 'at home', (a term which includes their lodgings) nearly a quarter mainly worked in their university or college libraries, a quarter said they worked in varying places, and a few said they worked mainly in other libraries such as those of the British Museum and the Public Records Office. To have so many students working at home cannot, to put it mildly, be conducive to intellectual contacts.

For the student in the humanities the library is both a place of work and a tool. As a place of work it has considerable short-comings. Some students spoke of the difficulties caused by their inability to use a typewriter when working in a library. But although the ability to use such a well established and elementary piece of mechanisation may seem important for the efficiency of research, few students mentioned it, for the simple reason that they had far more elementary needs that were not being met. For example, there was nowhere where they could leave their books overnight ready to start work again in the morning. Many had to start each day by first finding a place at which to work, then finding the books on which they were working. Any card index boxes, etc., that they were using had to be brought in with them each day. In some cases, there was

even a risk that their books might be cleared away while they were at lunch.

But even these considerable difficulties and obstacles to work pale to insignificance compared with their difficulties in getting the books they need - the essential tools of their trade. Unfortunately we did not have a specific question on the adequacy of the library service - only a general question on whether they were meeting any special problems or difficulties in connection with their research that had not been dealt with in earlier questions. Their answers are given in the next table. A specific question on libraries would have resulted in a larger number reporting library difficulties - respondents tended to mention only the one problem that caused them most trouble.

TABLE 8. Difficulties with research due to library service, supply of equipment; percentages of current students reporting difficulties from each source.

	Arts	Social studies and education	Pure science	Applied science
	%	%	%	%
Difficulties with library, supply of equipment etc:				
Library	39	40	16	11
Equipment	4	14	36	40
Other difficulties	27	23	12	11
No difficulties of these kinds	28	23	36	39
Insufficient information	0	7	6	1
N (=100)	117	78	266	235

The demands made on libraries by research students in the humanities vary a great deal and it would not be reasonable to expect the library of a student's own university to meet them all. If he is working on parish records or on a great man's papers he must go wherever his material is. If he is studying an obscure Italian poet he will probably have to go to Italy (indeed that may be the reason why he is studying the obscure Italian poet!) Beyond these specialised needs for material that is bound to be located in specific places, almost all research students in the humanities need large numbers of books that could equally well be in any university library. Some they want to read in entirety, but most they want only to scan briefly for references to the particular historical events being studied, the chosen author, or whatever the topic is. As there are almost as many topics for research students as there are students, only a library with a first-rate collection of books and a high annual expenditure on books and journals can meet even the greater part of the needs of most of the students. In my view there are only four university towns in Britain which come near the standards

required. Oxford and Cambridge Universities spend relatively heavily on their libraries (though far less than, say, Harvard²), they have great collections and are copyright libraries. London has the varied resources of its university and college libraries, including such specialist collections as the LSE Library (the British Library of Political and Economic Science); even more important it has the national collection in the British Museum Library, and it has other specialised public libraries, such as that of the Patents Office. Edinburgh University and its associated colleges have good collections, though these are inadequate for the needs of its research students; but the presence in Edinburgh of one of the six copyright libraries - the National Library for Scotland - justifies the town's inclusion in the list of those that can make some pretence at meeting the needs of research students.

Where a student cannot get the books he wants in his own town there are three ways in which he can get them:

- (1) He can visit libraries in other towns.
- (2) His library may borrow the book for him.
- (3) His library may buy the book, or, if it cannot be bought, buy a photocopy of it or a microfilm copy.

In practice, the third alternative is generally ruled out on grounds of cost - especially if the book is out of print and not available secondhand. The remark³ of the Robbins Committee that "The microfilm has made the contents of all the libraries of the world freely available", would be greeted with astonishment by most graduate students - microfilm copies of books cost about 3d a page. There are other difficulties in the use of micro-film too.

For most students, once they have exhausted the resources of their own library, the choice lies between travel and inter-library loan. Visits to other towns in search of books can be expensive, and some students' grants do not cover the cost, or the student doesn't know that they cover the cost, or they cover only part of it leaving the student out of pocket. Such visits are also time consuming, both while the student is travelling and while he learns how to use a strange library. In practice therefore students mainly seem to use inter-library loan. The students we interviewed were very critical of the way it operates. They complained that it frequently took weeks rather than days to get a book - a complaint borne out by figures given to the Parry Committee⁴ for the time taken by the National Central Library to satisfy an application from a university for a book:

'Cumulatively, 41% of requests were met by the end of one week, and 67% by the end of two weeks. There were extremely long delays for some of the remaining 33%, 5.6% of which took over six weeks.'

It should be noted that these were times taken where the book was supplied. In other cases the university library might, after a long delay, be told that it was not available. Also the time from the student making the request for a book to

its being placed in his hand would be appreciably longer than the times given above.

Any delay in getting a book upsets the orderly planning of the student's research, and repeated delays of several weeks can have a serious effect causing a lot of time to be wasted. Also the time and effort of ordering a book and repeatedly enquiring whether it has arrived adds considerably to the work of, say, following up a reference. How far these delays matter depends on the proportion of his books that a student has to get by inter-library loan. At one major university at which we interviewed, some of the students complained that they had to get virtually all their books in that way.

To sum up, in most universities too few books are held locally for the needs of research students in the humanities to be met, and a substantial proportion of the students are dissatisfied with the facilities provided for them by their universities.

Having dealt very briefly with the conditions of work of these students and the extent of their contacts with their university, I now want to turn to the relationship between these general circumstances and both the students attitudes to their research and their wastage rates.

The years of apprenticeship in research leading to a Ph.D or other higher degree, are years of hard and exacting toil. The toil often brings its own satisfactions - and not merely for the few who have the good fortune to be working in libraries in Paris or Rome, or doing field-work in Skye throughout the summer. There is initially the interest of the new work - as one student put it: "Thank God I have got rid of all those stupid and irrelevant subjects and am now doing something interesting". There is the feeling of achievement when results are beginning to appear. There is the satisfaction of feeling that one is working for oneself and not for some outside 'boss' or large impersonal organisation. There is the ability to come and go as one likes and to work the hours that suit ones own tastes and convenience. There is a feeling of independence and self-sufficiency, that for many students, is accompanied by acute anxiety. There is sometimes also the feeling of belonging to a small select group, perhaps the dedicated scientists or scholars of ones own department, or perhaps the handful of people throughout the world who are working in the same field.

At the beginning of research studies, however, some of these rewards and satisfactions are in the future. For many students the first reaction to graduate work is a feeling of loneliness. For many this arises because their friends have left the university. For the minority who have changed universities it is because they find themselves in a new environment where they know hardly anyone. They now need to make new friendships in the new circles in which they are moving. They found it relatively easy to do this as undergraduates because they went to lectures and classes with the same people and got to know them. But for many of the research students nothing of the kind is now possible. They go to hardly any lectures or classes, and there may be no other research student in their field at their university. A few, especially those taking an active part in the students' union or student societies, have friends or can make new friends

amongst the undergraduates - indeed a small minority enter graduate study primarily because it gives them a chance to achieve or retain power and position in student organisations. But most of them increasingly feel that they have little in common with the undergraduates and they tend to withdraw from the societies of which they were members before they graduated. As one of them put it: "The longer you are here the more you age in relation to other students".

Mingled with the social loneliness is a feeling of intellectual isolation. This may be more than just a lack of people to whom they can talk in detail and as equals about their chosen field, it may be a lack of people with whom they can talk about the problems of research in a more general way, whom they can tell about their day-to-day problems without feeling that they are being boring. But an important element in this is also the lack of the stimulation that comes from constant contact with the leading thinkers in their field.

One of the effects of the loneliness and isolation is often a lack of confidence in themselves that is often coupled with a general doubt whether what they are doing is worthwhile.

In our interviews with students in the humanities the loneliness and intellectual isolation were a constantly recurring theme, but its extent is not easy to measure. Although, as one would expect, it is found mainly in small departments, a few small departments succeed in bringing their research students into social and intellectual fellowship with the staff, while some relatively large departments somehow succeed in completely isolating the individual student. Also some people need far less social contact than others. Moreover, if, as I believe, it affects most students in most arts departments in most universities this does not mean it affects the majority of students - a substantial proportion of research students in the humanities are in a few relatively large Oxbridge departments.

The nearest we got to measuring the extent of loneliness was with a question: "Would you agree with the statement that a postgraduate student's life is a lonely one?" The answers of the British students are shown in the next table - the overseas students present special problems here.

TABLE 9. British research students' replies to the question: "Do you agree with the statement that a postgraduate student's life is a lonely one?"

	Arts	Social studies and education	Science and technology
	%	%	%
Yes	51	34	18
No	21	23	55
Can be, but not in my case	29	43	27
	100	100	100
Number of respondents	77	44	343

Only a fifth of arts students were prepared to say that a postgraduate student's life is not a lonely one, compared with more than half of these in science. More than half the arts students categorically said it was a lonely life.

Another cause of discontent is the feeling that they lack status. Some of their contemporaries, and even of their juniors, are members of staff, but they are not, and often they do not get any more privileges or facilities than the undergraduates. At Oxbridge in particular they are often subjected to petty restrictions which they resent.

In our interviews we were mainly talking to those graduate students who could be expected to find their research studies within the general framework and conditions provided by their universities relatively congenial; they were the survivors. How many did not survive? For this we have to turn to figures from our survey of people who began graduate education in 1957/58. But before looking at these figures, I must draw attention to one difference between our figures for success at postgraduate level and the similar figure for wastage at first degree level. At undergraduate level a student has to complete his studies and sit his degree within a finite time. Either he succeeds in doing this or he fails. Candidates for research degrees in most British universities however, can remain candidates indefinitely without submitting their theses. This means that, in addition to those who have been successful there are two groups, firstly those who have failed or have given up their studies, secondly those who still consider themselves candidates for a research degree. On balance it seems unlikely that most of those who, nine years after starting work for a research degree, have not yet achieved it, will ever be successful in gaining it. We have therefore divided our group into those who had, and those who had not, been successful in gaining the degree at which they were aiming in 1957/58. Some of them, however, have since gained other degrees. The variations between subject fields are shown in the next table.

TABLE 10. Graduate students who began working for higher degrees in 1957/58: all British universities except Oxford, Cambridge and Surrey.

Subject field	Registered for doctorates		Registered for masters degrees		All higher degrees	
	Number	Percent not successful	Number	Percent not successful	Number	Percent not successful
Arts	119	50	232	50	351	50
Social studies	80	40	155	54	235	51
Science	761	15	297	47	1,058	24
Technology	220	23	138	26	358	24
Other	90	31	129	46	219	40
All fields	1,270	22	951	46	2,221	32

These figures were collected direct from the universities. Other figures obtained from the respondents showed that the omission here of figures for Oxford and Cambridge made virtually no difference to the percentages not successful. The most striking feature of the table is the high percentage in arts who had not succeeded in gaining the qualification at which they were aiming. The contrast is sharpest between candidates for doctorates in the arts and those in science.

There will be a full analysis of these data in a book⁵ by Stephen Hatch and myself to be published in 1968. A small part of the high figure for arts is due to there being a higher percentage of part-time students, who have a lower success rate. But these students were only a small minority even in arts, and the success rate would not have been much higher without them. Also the relative paucity of awards in the arts may have had some effect; but its main effect seems to have been to keep down the number who started on higher degrees at all and, perhaps, to route more of them towards a masters degree and fewer to the longer course of study leading to a doctorate. But after every factor that is identifiable has been allowed for, there still remains a substantial difference between the success rate in the arts and the sciences which it is difficult to attribute to any cause but the nature of the arrangements for graduate study that I have been describing. After all, when a student is mainly working in his lodgings, having only infrequent contact with staff or fellow students, meeting considerable difficulty in getting books, and living on a grant that, though generally adequate, is far less than he could earn, only the most single-minded devotion to research will keep him going. When in addition he comes to realise that a research degree is not a magic key to all manner of opportunities, it is small wonder that he gives up. Diagnosis is not very useful without a prescription for a remedy. It is at this point that we come back to the problem to which I referred at the beginning of my paper, that any recommendations imply certain conscious or unconscious value judgments. One that many people might make is that the students should have adequate instruction and supervision and, in general, conditions that permit them to work efficiently, with a minimum of frustration, and with no more anxiety than is an inseparable part of research. This period when they are working only for themselves and doing what they most want to do should be one of happiness, not, as it too often is, one of misery.

Perhaps the most obvious conclusions to follow from these assumptions are that most research students should be concentrated in the four universities that can offer them reasonably adequate library facilities, and that, within those four universities, there should be a large number of reforms in the teaching and supervision of research students and the facilities provided for them. The details of these reforms could well form the subject of a paper in their own right, and I am sorry that I cannot adequately discuss them here, but some lines they might take are probably clear from what I have said about present conditions.

But such recommendations are based on the assumption that the main purposes of the arrangements for research study are to provide graduates with an apprenticeship in scholarly research and with research degrees. It ignores the growing role of the research student in the multiversity, in institutions in which research is frequently regarded as more important than undergraduate

teaching. To supervise a research student is looked upon as one of the most attractive sides of university teaching, and for a department to have research students is more than just a status symbol; it helps the department to attract the staff it wants. The reaction of staff with whom I discussed the possibility of grouping research students into a few universities was almost invariably: "I would agree with that as long as we were one of the institutions chosen". If research students are there for the benefit of the academic staff rather than for their own good, to concentrate them is no answer.

The second best from the point of view of the student might be to reform the care of postgraduates at their present universities. But would this be in the national interest or the real interest of the students? A research degree does not generally increase a graduate's income. In science it can be argued that it is nevertheless of benefit to the economy - though I, personally, would dispute this - but such an argument does not apply to the arts. It can also be argued that a research degree gives the graduate the opportunity to enter an occupation he would prefer, even with a lower salary, to those already open to him. This may apply in the arts, but the number of openings in such occupations are far fewer than in the annual entry of research students. It can also be argued that education is good in itself and every opportunity ought to be provided for its acquisition. But the resources available for education are limited, and it is not hard to think of other competing opportunities for their use which meet some of the community's other objectives, such as greater social justice or the expansion of the economy. It may well be, therefore, that the present system, with its high wastage rate meets the country's needs by keeping down the scale of research study in the arts.

This may seem rather a cynical note on which to end; so I will make two further points. Firstly in my view it is undesirable to regard research students as almost a chattel, provided for the good of the staff. I would therefore like to see much more information provided for graduates on the problems of deciding whether to enter graduate study and if so what kind of study and where - a kind of graduate students Which?. Also I would like to see an end to the present system by which all graduate education is provided either free or with a heavy subsidy. This has the disadvantage that unless some case based on the national interests can be made out the amount provided has to be limited. I would prefer to break away from ideas of national interest, at least in graduate study in the humanities, and regard it instead as something which graduates should be able to buy for themselves for enjoyment at an unsubsidised price in the same way in which they buy a car, out of savings or from a loan.

My second point is that I think this study brings out one important use of research. It can help sort out the issues on which unconscious value judgments are habitually made so that they can be discussed.

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SUPPLEMENTARY PREDICTIVE INFORMATION
FOR UNIVERSITY ADMISSION

J. DREVER
(Principal, University of Dundee)

What I have to report contains no elements of technical or educational novelty. What is important is that it is happening here and now. It is also important that there should be the widest possible discussion of what is going on, since the implications can so easily be misunderstood.

The history of the enterprise is quite short. When taking evidence from the schools, the Robbins Committee was repeatedly informed that competitive pressures for university entrance had impaired the value of the sixth form, which was once a characteristic and admirable feature of the English educational system. Pupils were tending to restrict the range of subjects studied, and even within that range were working in a narrow way because of examination pressures. Again and again we were told that it was not at all uncommon for the same subject to be repeated at the same level for a second or even a third year in order to obtain a higher grade. Yet it is widely admitted that the 'A' level examinations were not designed to be used in this way as elements in a competition, and to remodel them on entrance scholarship lines would be to disregard the considerable numbers who sit with no intention of going on to the universities.

From the universities themselves there were also a number of complaints. First of all 'A' level results are not available until late in the year in which a candidate proposes to enter. Secondly the evidence is that 'A' level grades have only a limited contribution to make to decisions on admission. In some areas they are good predictors, but in others they do not appear to have much relationship with university performance. Finally and most important there was the educational criticism already advanced by the schools, namely that the kind of cramming that is now prevalent for 'A' level can often lead to disorientation or exhaustion at the university.

A discussion of the value of school reports in this context seemed to indicate that from some head teachers they were found to be more valuable than any other kind of information, but from the majority they did not appear to add much to examination marks. We had also available some evidence from a number of university departments that had been making an experimental use of aptitude tests. A few of the findings were discouraging, but more of them were promising, and on balance there seemed to be a case for further study.

Looking back, I think it might be claimed that it was the educational disadvantages of the present system which weighed most heavily with the Robbins Committee. It seemed that the schools were being forced to do something they did not want to do and ought not to do by the need for securing university places

for their pupils in a time of scarcity. The possible reduction in university wastage that improved selection might produce featured only as a subsidiary aim. We were aware that this country has one of the lowest wastage rates in the world in its system of higher education, and it appeared likely that substantial improvement would result from better teaching in the sixth form and at university, rather than from the invention of some highly successful screening device.

A great many other people were thinking about this problem at the same time. Petch published two papers on "OCE and Degree" in 1961 and 1963, and a more technical paper on the same subject entitled "A Study of the Relation between OCE and Degree Results" by Barnett and Lewis appeared in the *Journal of the Royal Statistical Society*, also in 1963. Oliver, whose thinking and work in this area have been of primary importance, made a lively and convincing case for the use of aptitude tests in the *Universities Quarterly* for June 1962, and I prepared a survey of the field for the Robbins Committee which formed the basis of the Gifford Thomson Lecture at Edinburgh in 1963. Some wider considerations involving personality variables and social factors were brought in by Minnowsbury in her monograph on student selection published by the *Sociological Review*, while Perrow, in his book "The Chosen Few", touched on the importance of non-intellectual considerations in a way which foreshadowed his more recent approach.

So the modest proposals of the Robbins Committee were in line with a good deal of current educational thinking. They recommended: 1) "That more attention should be paid to school records, which should give some assessment of performance over a period of years and a clear indication of the candidate's aptitude for the work for which he or she is applying"; and 2) "That investigation should be made into the ways of testing this aptitude".

The passage containing these recommendations emphasized the important point that a discontinuation of academic examinations is not envisaged: "Thus, with school records, must continue to play an essential part in selection procedures. But if some of the predictive load could be shifted from examinations, the pressure on candidates to cram for them would be less, and selection is likely to be more efficient if based on more than one type of test." I have the point I have already made, that the educational gain is put before the improvement in efficiency of selection.

The Robbins recommendations were taken up by the Committee of Vice-Chancellors and Principals, who asked Lord James to bring together a small group for preliminary discussions. Out of these arose the present structure, in which a steering committee chaired by Lord James forms a link with the Committee of Vice-Chancellors, the Schools Council, the Department of Education and Science, and a number of other interested bodies, while a Directorate, which I chair, looks after the actual operations, in which the University of London Schools Examination Council and the Joint Matriculation Board play an active part. We have a full-time project co-ordinator in Mr. Salisbury, with secretarial and, at a later stage, statistical staff.

When we came to consider what we might do, we found that a full-scale investigation both into school reporting and aptitude testing could not be financed. And so most of our efforts have been concentrated into the latter field. It may be that this will prove to have been a blessing in disguise. A few weeks ago we were invited to the United States to discuss our plans with the College Entrance Examination Board and the Educational Testing Service. It turned out that they had already done a good deal of work on school reporting, and had not been able to devise any means by which a worth-while addition could be made to the "grade average" which is based upon high school examinations. It should be borne in mind that this may cover four years, and contains within it components derived from not merely annual examinations, but oral performance in class and weekly tests. It is thus a much more broadly based and solid affair than the pen picture which a head teacher sometimes composes on the basis of sixth form work and hearsay evidence. We hope none the less to make a further study of school reporting, perhaps taking the U.C.C.A. form as our point of departure. In the meantime we are concentrating on a test.

As you know, to devise a test for any particular purpose is a time-consuming operation because of the need to pre-test the items used, and establish their characteristics in relation to the population for which the test is being constructed. Fortunately we were able to shorten the delay because Oliver had already made an academic aptitude test for his own research on sixth forms. He was good enough to put this at our disposal, to be used both as our own first test, and as a vehicle for pre-test items. The Oliver test is based on the Scholastic Aptitude Test of the College Entrance Examination Board and like it is divided into a verbal and a mathematical section. An information booklet describing the test and giving examples was sent to the schools involved some weeks before the date of the actual testing. There are five types of verbal questions: a) antonyms; b) analogies; c) reading comprehension; d) sentence completion; and e) verbal discrimination. The mathematical items contain problems of various kinds and data sufficiency questions. The new items which we added for our test next year have the same characteristics. The verbal items were constructed by researchers working with the JMB in Manchester and the mathematical items by workers with the ULSEC in London, who also put the whole test together.

The first test was given on October 19, 1967. It passed off satisfactorily, and we now have completed tests for some 40,000 candidates. Our sample was limited to pupils in the fourth term of the sixth form. In addition, the University of Oxford asked for permission to give our test to all their candidates for next year. Needless to say, this was on a purely experimental basis, and some of the candidates formed part of our own sample. Nearly 2,000 schools were involved altogether. Not all of those tested were at school, however, since we were able to arrange for some 1,000 first year undergraduates at seven universities to take the test. Follow-up data from them will give us early indication of the probable usefulness of our scores. In addition to the test a questionnaire was given to provide background information of an educational and sociological kind. This must not be confused with the school report aspect of the whole study, but is an obviously desirable element in any research on test and criterion performance. The questionnaire turned out to be the most

troublesome part of the procedure so far as the schools were concerned. Probably we were too ambitious and tried to extract more information than the time or conditions permitted. We received many comments from the schools, mostly helpful, though sometimes, and rightly, critical. Emboldened by this response we imposed an additional task on the teachers by asking them to rate the academic promise of those of their pupils who had taken the test.

It is when we turn to the benefits that may flow from our work that elements of novelty and interest begin to appear. At the moment the sixth form is the object of anxious scrutiny, and various new possibilities are being suggested and discussed. The availability of a standardised and relevant score in this context may be most helpful. If we intend to make some empirical trial of these new ideas, as we should, then we need some calibrating measure which could be used to relate different procedures to one another and to the eventual outcome. We also need something which might be used to mitigate the anxiety of those teachers who might fear that untried procedures could harm the educational prospects of their pupils. But first of all let us be clear what the test will not do. Successful transition from school to university requires that there should be no gap between the level attained at the one and the level assumed to have been reached by the other. If a pupil has not studied calculus or has never met a Greek irregular verb, then his prospects in university mathematics or classics are not good, however bright he may be in other ways. Thus the test will never be able to function as an indicator of academic aptitude in areas where specific knowledge of some sort is required. On the other hand, many university subjects are not studied at school, or not studied in the same way, and here a test score may turn out to be at least as relevant as 'A' level marks. Evidence from the United States suggests that if we take university subjects as a whole, school performance is a slightly better predictor than test scores. On the other hand, studies in this country have indicated that, at least in the social sciences, test scores may do better than 'A' level marks. What is particularly dangerous at this juncture is that in the conditions prevailing here university selectors may be tempted to put altogether too much weight upon test scores once they have established themselves as being usefully related to university performance. The administrative difficulties of the present position are great. Many candidates at the time of their application have only 'O' level marks, and if something more relevant were to become available at a time when many decisions have to be made, there is no doubt that it might be used wisely. Hence there would be every justification for the claim already made in some quarters that what we are doing is providing a sort of "eighth form". Indeed the circumstances in which we find ourselves today with regard to higher education are very similar to those which existed in secondary education when the "eleven plus" was first used.

Institutional inflexibility and shortage of places in the most highly regarded type of institutions could easily force us to follow one of the less satisfactory options in our educational history. One can easily foresee the entry that such a development would produce. A candidate admitted to a university is in effect awarded a substantial scholarship. Donor attitudes to scholarshipism is that they should be awarded to someone for doing well rather than being bright. Whatever you do, it must never happen or appear to happen that the donor either is given public money at the expense of the worthy and laborious scholar. The

notion of merit as a major condition of access to higher education is one which we cannot ignore.

All of this leads on to the second and more important part of our enterprise, which is primarily educational. Suppose that, in the course of the next few years, we can establish the predictive value of our test scores. It will then become necessary to make sure that these are used correctly. If we survey the methods by which at present candidates are selected for higher education, we find so great a diversity that the word "chaos" might not be inappropriate. In many cases selection is done at a departmental level for particular honours schools. In others the faculty acts as the selecting agency, and here there may be members of staff whose work has primarily to do with admissions. In some universities there is a collegiate component, in many the candidates are interviewed, and so on. Any attempt to ensure a satisfactory use of test scores would clearly require us to make contact with a large number of people with very different ideas of what they are about. Fortunately the fact that our investigations will require us to wait several years gives us an opportunity to make sure that an instrument which we hope will be efficient is not used inefficiently.

Another contribution which a standardised score of the kind we are discussing can make to higher education is in relation to academic examinations. There is a great deal of uneasiness about these, and at the same time a certain reluctance to do very much about them. The trouble is that university examinations in particular have for long been regarded as the criterion against which other types of examination are validated. Any calling in question of the criterion produces so much insecurity within the system as a whole that it tends to be unacceptable. Yet there is ample evidence, though much of it is necessarily unpublished, that university examinations, and no doubt others within the system of higher education, have often less reliability than their position as criteria would entitle us to expect. In this precarious position, where the academic components have to lean against one another for support, it would be of great value to have a standardised measure resting on its own foundations.

But in the end what we are doing will justify itself more as a contribution to the educational process itself than as an aid to selection or to research on examinations. There are two ways in which it can do this, and I have mentioned both of these already. First of all, by providing supplementary evidence which university selectors can use with some confidence, it will free the schools from the straitjacket in which they are at present confined, and allow them to try out the various types of sixth form curriculum that are currently under discussion. Secondly, by introducing reasonably objective and standardised measurement into the system of higher education it will make possible a comparison between different types of curriculum. At present we have no very satisfactory variable in terms of which different groups can be matched with one another, so that the effectiveness of different experimental curricula can be determined. A test score of the kind that we hope to provide should make it possible for us to introduce more flexibility and variety into the sixth form, and to assess what we have done. Thus, at the end of the day we may reduce wastage, not so much by eliminating the unfit as by enabling better educated candidates to reach the universities, and helping their examiners to recognise their merits when they get there.